



FRD ACTIVITIES REPORT

April - June 2016



RESEARCH PROGRAMS

Project Sagebrush

Plans for the tracer sampling arrays for both the daytime (July-August) and nighttime (October) experimental periods of Phase 2 of Project Sagebrush have been finalized. Since these experiments are focusing on dispersion in light winds, FRD will be using 210° wide sampling arcs to optimize the available number of bag samplers. Within each arc, the samplers are spaced 6° apart. The arcs for the daytime releases will be centered north-northeast of the release point. During the nighttime releases the arcs will be centered northeast of the release point. These orientations are based on the most common wind directions observed on a nearby tower. A mobile 28 m tower from Aluma Tower arrived at FRD in late June. This tower will sample the vertical tracer distribution during the tracer releases using bag samplers placed at intervals up the tower.

All four gas chromatographs have been brought into operational mode and characterized for dynamic range and instrument limit of detection. Cleaning of the sample bags contained in the 800 bag sampler cartridges is nearly complete. That includes checks on the effectiveness of the bag cleaning by gas chromatography analysis in the lab. The proper operation of the 150 available bag samplers was completed previously. Four fast response analyzers are operational at the time of this writing and attempts are being made to increase that number.

FRD already has a large number of meteorological instruments available to measure boundary layer structure during the Sagebrush releases. Washington State University will be deploying an additional 6 sonic anemometers as part of the project in early July. During the tracer releases, these sonic anemometers will be deployed in a horizontal array to measure spatial variability in the turbulence field.

The manuscript “Project Sagebrush: Revisiting the value of the horizontal plume spread parameter σ_y ” at the Journal of Applied Meteorology and Climatology was accepted for publication in final form. The manuscript “An investigation into the magnitude and variation in the standard deviation of horizontal wind direction σ_θ ” was submitted to the journal Boundary Layer Meteorology. Much of the material included in the manuscript is related to the results of Project Sagebrush.

(Kirk.Clawson@noaa.gov with participation of all FRD staff)

Birch Creek Valley Wind Flow Study

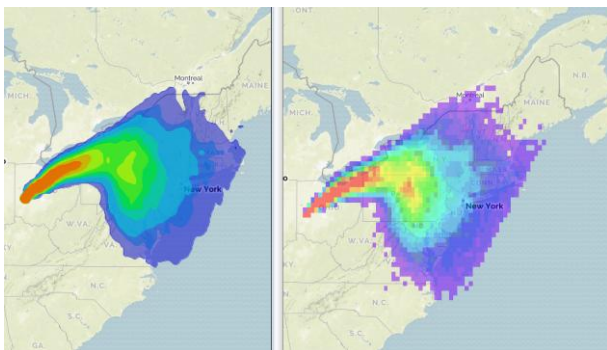
The manuscript “Evidence for gap flows in the Birch Creek Valley, Idaho” was submitted for a second round of review at the Journal of the Atmospheric Sciences in late April. The results of that are expected soon. In collaboration with the Fire Sciences Laboratory of the U.S. Forest Service, work has begun on another manuscript that will focus on the details of a specific weather event. (Dennis.Finn@noaa.gov)

Wind Forecast Improvement Project (WFIP2)

With half of the WFIP2 field deployment now complete, a great deal of quality data has been collected and most instruments have functioned properly. One issue that has developed at two of the Oregon WFIP2 deployment sites is frequent damage to buried cables by rodents. During recent visits to the sites, the cables were encased in conduit to limit future damage. FRD is also comparing the WFIP2 observations with model forecasts, particularly with a special version of the High Resolution Rapid Refresh (HRRR) model being run for WFIP2 by ESRL. Much of the model comparison effort is focusing on the surface energy balance and evaluating the parameterization of air-surface exchange in the model. These comparisons are still in the early stages. (Matt.Brewer@noaa.gov, Shane Beard, Rick Eckman, Kirk Clawson)

HYSPLIT

Work continued on the HYSPLIT Improvement Project for ARL HQ. HQ is interested in assessing the state-of-the-art in mapping displays to help guide future HYSPLIT development. In support of that effort, a survey was conducted of some of the more popular mapping APIs. The survey assessed the strengths and weaknesses of each. Software was also developed to explore different contouring approaches as shown in the figure below from the 1983 Cross-Appalachian Tracer Experiment (CAPTEX). The image on the left was developed by taking output from the HYSPLIT cdump file and converting it into gridded data. A contouring routine, using a triangular mesh, was implemented to read the gridded data and output contoured line segments. Additional routines were written to take the line segments and convert them into discrete polygons. A final piece of software was developed to load and smooth the polygons and render them as plume isopleths over a map background. The figure on the right is a first cut at applying a gradient filled color map at each grid cell location. (Brad.Reese@noaa.gov).



New Potential Tracer Studies

FRD has received four external inquiries regarding tracers this fiscal year. One was from the University of Wyoming to explore options for using tracers in a cloud-seeding study. A second was from the University of Hawaii to conduct a small tracer study at a geothermal plant on the Island of Hawaii. The third is from John Hopkins University involving a tracer release at the Idaho National Laboratory. A final inquiry came from Montgomery County, Maryland. FRD is evaluating the inquiries based on the alignment of the proposed work with the laboratory's research goals and NOAA's mission. Funding is available for the Hawaii project, and this study will likely take place in fiscal year 2017. The John

Hopkins study also has a good chance of moving forward, mainly because the university is testing their own tracer, and FRD's involvement is primarily through its normal support for the Idaho National Laboratory. (Kirk.Clawson@noaa.gov and Rick Eckman)

NOAA/IDAHO NATIONAL LABORATORY (INL) METEOROLOGICAL RESEARCH PARTNERSHIP

NOAA/INL Mesonet

For the past two months, we have been actively testing potential replacements for the VHF radios used to collect data from the weather stations in the NOAA/INL mesonet. The radios being considered provide internet like connectivity over a VHF radio link. We have three sets of radios, one purchased and two on loan. For the testing, one radio is set up at the FRD office, one at the Jumpoff Peak repeater site, and one at the mesonet weather station in Roberts, ID. We turn the radios on, configure the data collection software to use the network link provided by the radios, and observe the progress of the data collection. All the radios worked and we were able to leave the two sets on loan installed for a few weeks. One radio performed significantly better than the others but all of the radios were less reliable than we would like.

Dispersion Modeling for Site Annual Report

Each year FRD performs a series of dispersion model runs using the previous year's data collected from the NOAA/INL Mesonet. The results of these runs appear in the INL Annual Site Environmental Report, including estimates of radiological doses to populations surrounding the INL. For many years, the division has used the MDIFFH puff model to perform the annual INL runs. However, INL contractors have recognized that a significant contribution to the annual doses comes from surface deposition, and MDIFFH does not have a working deposition algorithm. FRD therefore plans to switch to using the NOAA HYSPLIT model for the 2016 annual report (which will be published in 2017). This will require some development effort over the next year, including adjusting the HYSPLIT configuration to allow a year's worth of model simulations to run within a reasonable period of time. The effort will also have to consider the mix of isotopes that contribute to the annual doses and the deposition characteristics of the isotopes. (Richard.Eckman@noaa.gov)

Small Computing Cluster

The division has so far relied on multiple desktop workstations to perform the dispersion modeling and other computing activities associated with its partnership with the INL. However, these standard systems have come up short in some of the computing tasks that are now required. For example, some of the release scenarios for the INL Site involve many different radiological isotopes modeled over days of simulated time. Another example is the planned use of HYSPLIT to model annual emissions, as reported above. To address the computing limitations, FRD is purchasing a small high-performance computing cluster. The cluster will have four compute nodes each with 64 GB of memory and two sockets, providing at total of 80 processing cores. A separate head node will provide the interface for users. The cluster requires 5 rack units. (Richard.Eckman@noaa.gov)

Emergency Operations Center (EOC)

Team A participated in an EOC drill on 13 April. The drill centered on a transportation accident. Nowcasts and short term forecasts were issued and plume plots generated during the drill. (Jason.Rich@noaa.gov)

Team C participated in a drill on 24 May. The drill simulated a cask that was dropped at the Hot Fuel Examination Facility (HFEF) in MFC, with a potential breach of the hot cell containment. Short term forecasts and a HYSPLIT run were produced. (Dennis.Finn@noaa.gov)

INL Hazardous Weather Alert System

The NOAA INL Weather Center issued 7 hazardous weather statements last quarter. Six of those statements were issued for high winds and the seventh statement was issued for thunderstorms. (Jason.Rich@noaa.gov)

OTHER ACTIVITIES

Safety

Jason Rich and Donna Davis attended the “Writing Safety Procedures” during the Safety Fest of the Great Northwest on April 5, 2016.

Jason Rich, Brad Reese, Shane Beard and Matt Brewer attended the “Fall Protection” during the Safety Fest of the Great Northwest on April 6, 2016.

Shane Beard attended the “Cylinder/Gas Handling Safety” during the Safety Fest of the Great Northwest on April 8, 2016.

During April’s staff meeting, Roger Carter gave a presentation on the importance of taking a break. Information was provided by Safety & Health Magazine.

Donna Davis demonstrated how the online NOAA Accident Reporting system works during May’s staff meeting.

Jason Rich gave a presentation on Preventing and Responding to Snake Bites at the staff meeting in June. Information was provided by the Center for Disease Control and Prevention.

Travel

Kirk Clawson traveled to Leesburg, VA to attend the EMI SIG annual meeting, May 2-6, 2016.

Kirk Clawson traveled to Budapest, Hungary to attend/present at the 17th Conference on Harmonization within Atmospheric Dispersion Modeling for Regulatory Purposes, May 9-12, 2016.

Kirk Clawson, Rick Eckman, Dennis Finn, and Matt Brewer travel to College Park, MD to attend the 2016 ARL Science Review, June 20-23, 2016.

Training

All FRD employees completed the FY2016 NOAA Information Technology Security Awareness Course during the 3rd quarter.

“Purchase Card Refresher Training” was completed by all purchase card holders during the reporting quarter.

Donna Davis completed the course “DOC Active Shooter” training on May 6, 2016.

Donna Davis participated in the “Women’s Health 101” webinar on May 11, 2016.

All FRD employees completed the required training on the DOC-Web T&A in the month of June.

Miscellaneous

Kirk Clawson, Rick Eckman, Dennis Finn, and Matt Brewer participated in the 2016 ARL Science Review at ARL Headquarters. Kirk gave an overview of ARL’s work with tracers and its involvement in renewable energy research. The others presented posters related to FRD’s activities in dispersion and boundary-layer research.